



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,267	03/07/2002	Hironobu Ishikawa	Q68736	6535

7590 11/02/2005

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213

EXAMINER

DAVIS, DAVID DONALD

ART UNIT	PAPER NUMBER
----------	--------------

2652

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/090,267

Applicant(s)

ISHIKAWA ET AL.

Examiner

David D. Davis

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08/15/05.
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
4a) Of the above claim(s) 33 and 39 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-32, 34-38 and 42 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Status Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

Art Unit: 2652

DETAILED ACTION

Election/Restrictions

1. Claims 33 and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Election was made **without** traverse in the reply filed on April 21, 2004.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 14, 29-31, 34, 41 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Itoh et al (US 5,688,053). Itoh et al shows in figure 4 and discloses in column 6, lines 35-41 a ceramic dynamic-pressure bearing 101 including a first member 105 formed of ceramic and having a cylindrical outer surface. Figure 4 and column 6, lines 35-41 disclose that a second member 107 is formed of ceramic and has a cylindrical reception hole formed therein. The first member 105 is inserted into the reception hole of the second member 107 in such a manner as to be rotatable relative to the second member 107, about an axis. A thrust plate 103 or 109 formed of ceramic is facing at least one end face 10A of the second member 107 as viewed along the axis of rotation. The end face 10A of the second member 107 and a face of the thrust plate 103 or 109 is in opposition to the end face serving as thrust dynamic-pressure gap

Art Unit: 2652

definition surfaces so as to define a thrust dynamic-pressure gap therebetween. The ceramic dynamic-pressure bearing 101 satisfies the following requirements:

i) the thrust dynamic-pressure gap definition surface of the second member 107 which faces the thrust plate 103 or 109 has a flatness of not greater than 3 micrometer. See figure 6 and Table 1.

(ii) the thrust dynamic-pressure gap definition surface of the thrust plate 103 or 109 which faces the second member 107 has a flatness of not greater than 3 micrometers. See figure 6 and Table 1.

(iii) the thrust dynamic-pressure gap definition surface of the second member 107 which faces the thrust plate 103 or 109 and the thrust dynamic-pressure gap definition surface of the thrust plate 103 or 109 which faces the second member 107 have a total flatness of not greater than 3 micrometers. See figure 6 and Table 1.

(vi) a clearance between the mutually facing thrust dynamic-pressure gap definition surfaces of the second member 107 and the thrust plate 103 or 109 is greater than 0 micrometers and not greater than 2.5 micrometers as measured at outermost circumferential portions of the thrust dynamic-pressure gap definition surfaces.

Itoh et al shows in figure 4 an inner surface of the reception hole of the second member 107 and an outer circumferential surface of the first member 105 to be received inside the inner surface serve as radial dynamic-pressure gap definition surfaces, which define a radial dynamic-pressure gap therebetween. Itoh et al also shows in figure 4 and shows in figure 6 dynamic-pressure grooves 121 formed on the thrust dynamic-pressure definition surfaces.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

Art Unit: 2652

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al (US 5,688,053) in view of NIST Property Data Summaries. Itoh et al discloses the claimed invention see description, supra. However, Itoh et al is silent as to a specific ceramic being used such as alumina.

NIST discloses an alumina ceramic including ceramic crystal grains which contains an Al component in an amount of 90-99.5% by mass as reduced to Al_2O_3 and an oxide-type sintering aid component in an amount of 0.5-10% by mass as reduced to an oxide thereof. NIST also discloses that the alumina ceramic has an apparent density of 3.5-3.9 g/cm³. NIST also discloses that the alumina ceramic has a relative density of not less than 90%. NIST additionally discloses that the ceramic crystal grains have an average grain size of 1-7 μm . NIST further discloses that ceramic crystal grains having a grain size of 2-5 μm occupy an area percentage of not less than

40. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to specify that the ceramic of Itoh et al was alumina with notoriously well

known properties as taught by NIST. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to specify that a ceramic was alumina with notoriously well known properties because alumina is easily obtainable, readily available hard, heat and corrosion resistant material.

7. Claims 15, 16, 28, 32 and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al (US 5,688,053) in view of Jabbar et al (US 5,283,491). Itoh et al shows in figure 4 and discloses in column 6, lines 35-41 a ceramic dynamic-pressure bearing 101 including a first member 105 formed of ceramic and having a cylindrical outer surface. Figure 4 and column 6, lines 35-41 disclose that a second member 107 is formed of ceramic and has a cylindrical reception hole formed therein. The first member 105 is inserted into the reception hole of the second member 107 in such a manner as to be rotatable relative to the second member 107, about an axis. A thrust plate 103 or 109 formed of ceramic is facing at least one end face 10A of the second member 107 as viewed along the axis of rotation. The end face 10A of the second member 107 and a face of the thrust plate 103 or 109 is in opposition to the end face serving as thrust dynamic-pressure gap definition surfaces so as to define a thrust dynamic-pressure gap therebetween. The ceramic dynamic-pressure bearing 101 satisfies the following requirements:

i) the thrust dynamic-pressure gap definition surface of the second member 107 which faces the thrust plate 103 or 109 has a flatness of not greater than 3 micrometer. See figure 6 and Table 1.

(ii) the thrust dynamic-pressure gap definition surface of the thrust plate 103 or 109 which faces the second member 107 has a flatness of not greater than 3 micrometers. See figure 6 and Table 1.

Art Unit: 2652

(iii) the thrust dynamic-pressure gap definition surface of the second member 107 which faces the thrust plate 103 or 109 and the thrust dynamic-pressure gap definition surface of the thrust plate 103 or 109 which faces the second member 107 have a total flatness of not greater than 3 micrometers. See figure 6 and Table 1.

(vi) a clearance between the mutually facing thrust dynamic-pressure gap definition surfaces of the second member 107 and the thrust plate 103 or 109 is greater than 0 μm and not greater than 2.5 μm as measured at outermost circumferential portions of the thrust dynamic-pressure gap definition surfaces.

Itoh et al shows in figure 4 an inner surface of the reception hole of the second member 107 and an outer circumferential surface of the first member 105 to be received inside the inner surface serve as radial dynamic-pressure gap definition surfaces, which define a radial dynamic-pressure gap therebetween. Itoh et al also shows in figure 4 and shows in figure 6 dynamic-pressure grooves 121 formed on the thrust dynamic-pressure definition surfaces.

Itoh et al is silent, however, as to a thrust bearing utilized in a hard disk drive. Itoh is also silent as to a thrust plate being crowned.

Jabbar et al discloses a thrust bearing utilized in a hard disk drive in column 2, lines 42-49. Jabbar et al shows in figures 6C and 6D, for example, thrust plate 43 or 44 being crowned.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to utilize the ceramic thrust bearing of Itoh et al in a hard disk drive as taught by Jabbar et al. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to utilized a ceramic thrust bearing, which is well within the purview of a skilled artisan and absent an unobvious result, in a hard drive because ceramics are optimally hard and resistance to wear.

Art Unit: 2652

It also would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide a thrust plate of Itoh et al crowned as taught by Jabbar et al. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to provide a thrust to be crowned so as that the thrust bearing is able "to effectively work at any condition or configuration, such as horizontal, vertical, upside down, upright, etc." See column 6, lines 13-18.

8. Claims 17-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al (US 5,688,053) in view of Jabbar et al (US 5,283,491) as applied to claims 15 and 16 above, and further in view of of NIST Property Data Summaries. Itoh et al as modified by Jabbar et al discloses the claimed invention see description, supra. However, Itoh et al as modified by Jabbar et al is silent as to a specific ceramic being used such as alumina.

NIST discloses an alumina ceramic including ceramic crystal grains which contains an Al component in an amount of 90-99.5% by mass as reduced to Al_2O_3 and an oxide-type sintering aid component in an amount of 0.5-10% by mass as reduced to an oxide thereof. NIST also disclose that the alumina ceramic has an apparent density of 3.5-3.9 g/cm³. NIST also discloses that the alumina ceramic has a relative density of not less than 90%. NIST additionally discloses that the ceramic crystal grains have an average grain size of 1-7 μm . NIST further discloses that ceramic crystal grains having a grain size of 2-5 μm occupy an area percentage of not less than 40.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to specify that the ceramic of Itoh et al as modified by Jabbar et al was

Art Unit: 2652

alumina with notoriously well known properties as taught by NIST. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to specify that a ceramic was alumina with notoriously well known properties because alumina is easily obtainable, readily available hard, heat and corrosion resistant material.

Response to Arguments

9. Applicant's arguments filed August 15, 2005 have been fully considered but they are not persuasive. On page 21 in the fourth full paragraph applicant asserts that "flatness," as defined by the Standard JIS B0021 (1984), "is a distance between two virtual parallel planes, between which the face to be measured is positioned." The footnote for the definition of "flatness" leads, via the specification, to a figure 2 entitled flatness tolerance of JIS B0021 (1984) that simply shows two parallel planes. From this figure applicant concludes, as stated in the first paragraph on page 22, that the claimed 'flatness' requires that the respective gap definition surfaces be completely between two parallel virtual planes that are 3 μm apart. This limitation is not disclosed by Itoh." Using applicant's interpretation of flatness based on JIS B0021 (1984) and the diagram on page 23, the surface has a flatness, a distance between to *virtual* planes, *not* greater than 3 micrometers as disclosed by Itoh. Applicant states in the first full paragraph on page 23 that the flatness of Itoh "has little or no relevance to the overall flatness as the highest peaks of the curve [are] ignored" (sic). If the highest peaks are ignored and if flatness is the distance between to *virtual* planes, the flatness would be even less than 3 micrometers because peaks would be ignored.

Assuming *arguendo* applicant is in fact correct in the interpretation of the flatness of Itoh, applicant has not traversed, provided a simple direct denial, the fact that Itoh does not disclose the claimed flatness. Applicant merely states in the first full paragraph on page 23 that "the overall flatness" of Itoh "*can* be much larger" (emphasis added). Applicant is certainly encouraged to *traverse* the fact that Itoh does not disclosed the claimed flatness and provide support thereof.

On page 24, in the last full paragraph, applicant asserts "With regard to the element (vi), contrary to the Examiner's assertions, there is no disclosure in Itoh, of this claimed feature." The figures of Itoh are apart of the disclosure and the figures, at the very least, certainly show the claimed clearance.

Assuming *arguendo* applicant is in fact correct that Itoh does not show element (vi), applicant has not traversed, provided a simple direct denial, the fact that Itoh does not disclose (i.e. show) the claimed clearance. Applicant is certainly encouraged to *traverse* the fact that Itoh does not *show* the disclosed the claimed clearance and provide support thereof.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

Art Unit: 2652

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David D. Davis whose telephone number is 571-272-7572. The examiner can normally be reached on Monday thru Friday between 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David D. Davis
Primary Examiner
Art Unit 2652

ddd